

- N-Channel Application-Specific MOSFETs
- Ideal for CPU Core DC-DC Converters
- Low Conduction Losses
- Low Switching Losses
- Minimizes Parallel MOSFETs for high current applications

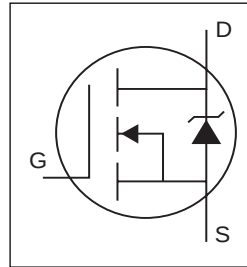
HEXFET® Chipset for DC-DC Converters

Description

These new devices employ advanced HEXFET® power MOSFET technology to achieve an unprecedented balance of on-resistance and gate charge. The reduced conduction and switching losses make them ideal for high efficiency DC-DC converters that power the latest generation of microprocessors.

Both the IRLR8103 and IRLR8503 have been optimized and are 100% tested for all parameters that are critical in synchronous buck converters including $R_{DS(on)}$, gate charge and C_{dv}/dt -induced turn-on immunity. The IRLR8103 offers particularly low $R_{DS(on)}$ and high C_{dv}/dt immunity for synchronous FET applications. The IRLR8503 offers an extremely low combination of Q_{sw} & $R_{DS(on)}$ for reduced losses in control FET applications.

The package is designed for vapor phase, infrared, convection, or wave soldering techniques. Power dissipation of greater than 80W is possible in a typical PCB mount application.



DEVICE RATINGS (typ.)

	IRLR8103	IRLR8503
V_{DS}	30V	30V
$R_{DS(on)}$	6 mΩ	12 mΩ
Q_G	45 nC	15 nC
Q_{sw}	20.3 nC	5.4 nC
Q_{oss}	23 nC	23 nC

Absolute Maximum Ratings

Parameter	Symbol	IRLR8103	IRLR8503	Units
Drain-Source Voltage	V_{DS}	30		V
Gate-Source Voltage	V_{GS}	±20		
Continuous Drain or Source Current ($V_{GS} \geq 10V$)	$T_A = 25^\circ C$	I_D	89⑤	A
	$T_L = 90^\circ C$		61⑤	
Pulsed Drain Current①	I_{DM}	350	196	
Power Dissipation	$T_A = 25^\circ C$	P_D	89	W
	$T_L = 90^\circ C$		42	
Junction & Storage Temperature Range	T_J, T_{STG}	-55 to 150		°C
Continuous Source Current (Body Diode)	I_S	89⑤	49⑤	A
Pulsed Source Current①	I_{SM}	350	196	

Thermal Resistance

Parameter		Max.	Units
Maximum Junction-to-Ambient PCB③	$R_{\theta JA}$	50	°C/W
Maximum Junction-to-Case	$R_{\theta JC}$	1.4	°C/W

IRLR8103/IRLR8503

International
IR Rectifier

Electrical Characteristics		IRLR8103			IRLR8503			Units	Conditions
Parameter		Min	Typ	Max	Min	Typ	Max		
Drain-to-Source Breakdown Voltage*	V_{DS}	30	–	–	30	–	–	V	$V_{GS} = 0V, I_D = 250\mu A$
Static Drain-Source on Resistance*	$R_{DS(on)}$	–	6	7.0	–	12	16	m Ω	$V_{GS} = 10V, I_D = 15A$ ②
		–	7	8.5		14	18	m Ω	$V_{GS} = 4.5V, I_D = 15A$ ②
Gate Threshold Voltage*	$V_{GS(th)}$	2.0	–	–	1.0	–	–	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
Drain-Source Leakage Current*	I_{DSS}	–	–	30	–	–	30	μA	$V_{DS} = 24V, V_{GS} = 0$
		–	–	150	–	–	150		$V_{DS} = 24V, V_{GS} = 0,$ $T_J = 100^\circ C$
Gate-Source Leakage Current*	I_{GSS}	–	–	± 100	–	–	± 100	nA	$V_{GS} = \pm 20V$
Total Gate Chg Cont FET*	Q_G	–	50	–	–	15	–	nC	$V_{GS} = 5V, I_D = 15A, V_{DS} = 16V$
Total Gate Chg Sync FET*	Q_G	–	45	–	–	13	–		$V_{GS} = 5V, V_{DS} < 100mV$
Pre-Vth Gate-Source Charge	Q_{GS1}	–	17	–	–	3.7	–		$V_{DS} = 16V, I_D = 15A$
Post-Vth Gate-Source Charge	Q_{GS2}	–	4.3	–	–	1.3	–		
Gate to Drain Charge	Q_{GD}	–	16	–	–	4.1	–		
Switch Chg($Q_{GS2} + Q_{GD}$)*	Q_{SW}	–	20.3	–	–	5.4	–		
Output Charge*	Q_{OSS}	–	23	–	–	23	–		$V_{DS} = 16V, V_{GS} = 0$
Gate Resistance	R_G	–	1.5	–	–	2.0	–	Ω	
Turn-on Delay Time	$t_d(on)$	–	TBD	–	–	TBD	–	ns	$V_{DD} = 16V, I_D = 15A$ $V_{GS} = 5V$ Clamped Inductive Load See test diagram Fig 19.
Rise Time	t_r	–	TBD	–	–	TBD	–		
Turn-off Delay Time	$t_d(off)$	–	TBD	–	–	TBD	–		
Fall Time	t_f	–	TBD	–	–	TBD	–		
Input Capacitance	C_{iss}	–	TBD	–	–	TBD	–	pF	$V_{DS} = 16V, V_{GS} = 0$
Output Capacitance	C_{oss}	–	TBD	–	–	TBD	–		
Reverse Transfer Capacitance	C_{rss}	–	TBD	–	–	TBD	–		

Source-Drain Rating & Characteristics

Parameter		Min	Typ	Max	Min	Typ	Max	Units	Conditions
Diode Forward Voltage*	V_{SD}	–	–	0.9	–	–	1.0	V	$I_S = 15A$ ②, $V_{GS} = 0V$
Reverse Recovery Charge④	Q_{rr}	–	100	–	–	89	–	nC	$di/dt \sim 700A/\mu s$ $V_{DS} = 16V, V_{GS} = 0V, I_S = 15A$
Reverse Recovery Charge (with Parallel Schottky)④	$Q_{rr(s)}$	–	77	–	–	75	–		$di/dt = 700A/\mu s$ (with 10BQ040) $V_{DS} = 16V, V_{GS} = 0V, I_S = 15A$

Notes:

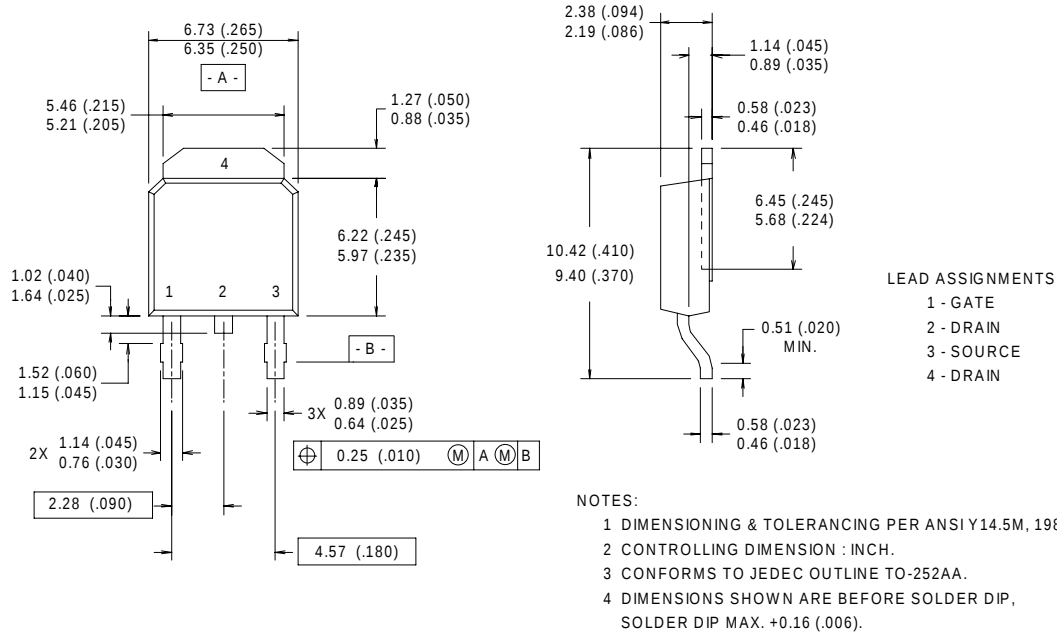
- ① Repetitive rating; pulse width limited by max. junction temperature.
 ② Pulse width $\leq 300 \mu s$; duty cycle $\leq 2\%$.
 ③ When mounted on 1 inch square copper board, $t < 10$ sec.

- ④ Typ = measured - Q_{oss}
 ⑤ Calculated continuous current based on maximum allowable Junction temperature; package limitation current = 20A
 * Devices are 100% tested to these parameters.

Package Outline

TO-252AA Outline

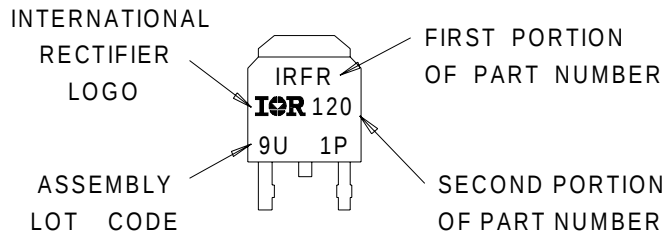
Dimensions are shown in millimeters (inches)



Part Marking Information

TO-252AA (D-PARK)

EXAMPLE : THIS IS AN IRFR120
WITH ASSEMBLY
LOT CODE 9U1P

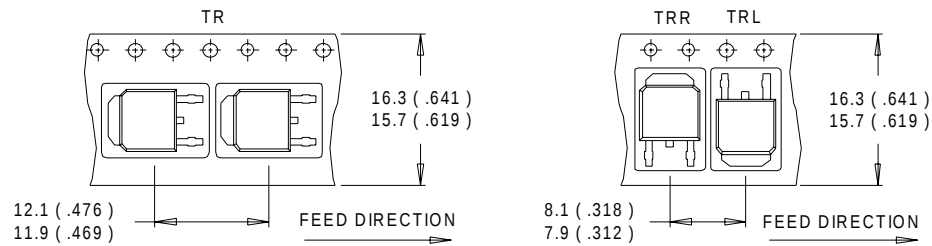


IRLR8103/IRLR8503

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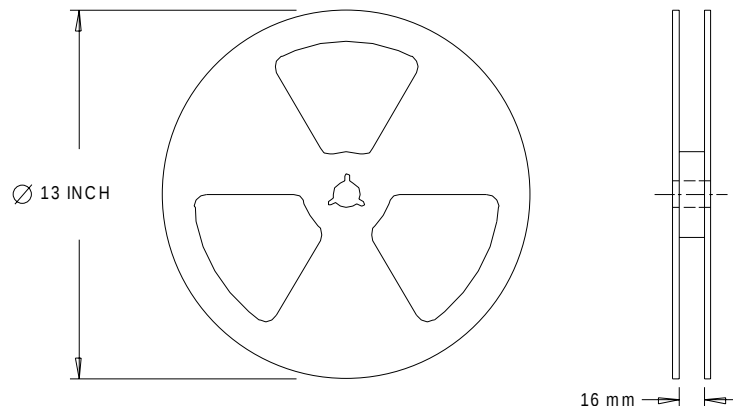
Tape & Reel Information

TO-252AA



NOTES :

1. CONTROLLING DIMENSION : MILLIMETER.
2. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
3. OUTLINE CONFORMS TO EIA-481 & EIA-541.



NOTES :

1. OUTLINE CONFORMS TO EIA-481.

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<http://www.irf.com/>

Data and specifications subject to change without notice.

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